

PATENT ABSTRACTS OF JAPAN

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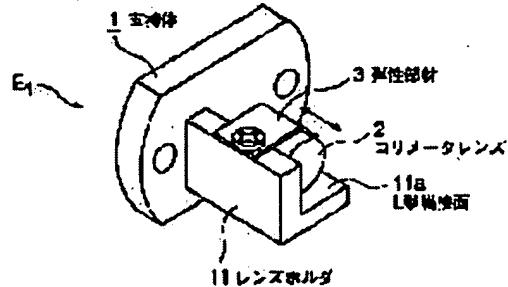
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(54) LIGHT SOURCE DEVICE

(57)Abstract:

PURPOSE: To simplify the assemblage of a collimator lens.

CONSTITUTION: An L-shaped lens holder 11 is integrally provided in the middle part of a supporting body 1 supporting a laser diode not shown in the figure and a collimator lens 2 is abutted on the L-shaped abutting surface 11a of the lens holder 11 by means of an elastic member 3. Focusing of the collimator lens is performed by sliding the collimator lens along the L-shaped abutting surface 11a of the lens holder 11. Since adhesive is not used, it is no fear that a trouble such as defocusing due to the swell and shrinkage of adhesive is occurs.



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CLAIMS**[Claim(s)]**

[Claim 1] Light equipment characterized by the light source supported by the light source support means, the collimator lens which makes parallel the illumination light generated from this light source, guidance means to guide this collimator lens in accordance with the optical axis of said illumination light, and having an energization means to energize said collimator lens in this, and forming said guidance means in it in one with said light source support means.

[Claim 2] Light equipment according to claim 1 characterized by equipping the guidance means with the L type contact side contacted by the peripheral face of a collimator lens.

[Claim 3] Light equipment according to claim 1 characterized by equipping the guidance means with the V groove contacted by the peripheral face of a collimator lens.

[Claim 4] Light equipment according to claim 1 which a guidance means is a wrap cylinder member about the peripheral face of a collimator lens, and is characterized by preparing the hole which makes this cylinder member penetrate an energization means.

[Claim 5] Light equipment according to claim 1 with which a guidance means is wrap semicircle cylinder part material in a part of peripheral face of a collimator lens, and is characterized by being constituted so that an energization means may cover the remaining part of the peripheral face of said collimator lens.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]**[0001]**

[Industrial Application] This invention relates to light equipment, such as an optical disk unit which performs informational record and playback using illumination light, such as a laser beam.

[0002]

[Description of the Prior Art] The light source unit which attached the collimator lens for changing into parallel light the emission light generated from now on to the light sources, such as semiconductor laser, is used for the optical disk unit which performs informational record and playback using illumination light, such as a laser beam.

[0003] Drawing 7 is the emission light L0 by which shows the optical system of a common optical disk unit, and outgoing radiation was carried out from the laser diode 101. It is changed into parallel light by the collimator lens 102, and incidence is carried out to an objective lens 105 through prism 103 and a mirror 104 by it. The light after passing an objective lens 105 turns into convergence light, carries out incidence to the disk which is not illustrated, and performs informational record playback. the light reflected from the disk -- the again same optical path as an outward trip -- a passage -- prism 103 -- incidence -- after carrying out, it converges again with a condenser lens 107, and incidence is carried out to a photodetector 108. A photodetector 108 changes this incident light into an electrical signal, and performs playback of a servo and recording information. At the time of the assembly of such optical system, it is the emission light L0 of a laser diode 101. In order to make it a perfect parallel light by the collimator lens 102, it is the emission light L0 about a collimator lens 102. It is necessary to make it move in the direction of an optical axis, and to carry out highly precise focus doubling.

[0004] Then, the conventional light source unit is a tool T0, making a laser diode 101 emit light, after inserting the lens-barrel 109 holding a collimator lens 102 in tubed base material 101a which is a laser diode 101 and one, as shown in drawing 8. It is constituted so that it may use, the lens-barrel 109 in base material 101a may be moved to shaft orientations and focus doubling may be performed. In addition, as a collimator lens 102 is shown in drawing 9, beforehand, it is fixed to a lens-barrel 109 by adhesives 109a, and, generally ultraviolet curing mold adhesives are used for adhesives 109a.

[0005]

[Problem(s) to be Solved by the Invention] However, according to the above-mentioned Prior art, there is a possibility of adhesives swelling and it contracting by change of temperature or humidity after needing the activity attached to the base material of a laser diode and also completing focus doubling of a collimator lens, for this reason the relative position of a collimator lens and a lens-barrel changing, and generating a focus gap as mentioned above after unifying a collimator lens and a lens-barrel with adhesives beforehand. Although what uses a spring etc. instead of adhesives and fixes a collimator lens to a lens-barrel is developed, assembly mark increase, and also assembly operation is complicated, and the yield is bad.

[0006] It is made in view of the trouble which the above-mentioned Prior art has, this invention is simple for attachment of a collimator lens, and since assembly mark do not need adhesives for few tops,

either, it aims at offering the light equipment which a possibility of producing the trouble by this does not have, either.

[0007]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the light equipment of this invention is characterized by the light source supported by the light source support means, the collimator lens which makes parallel the illumination light generated from this light source, guidance means to guide this collimator lens in accordance with the optical axis of said illumination light, and having an energization means to energize said collimator lens in this, and forming said guidance means in it in one with said light source support means.

[0008] It is good to equip the guidance means with the L type contact side contacted by the peripheral face of a collimator lens.

[0009] Moreover, the guidance means may be equipped with the V groove contacted by the peripheral face of a collimator lens.

[0010]

[Function] Attachment of a collimator lens is moving a collimator lens in accordance with a guidance means, and after performing focus doubling to the light source, it should just energize a collimator lens for a guidance means with an energization means. Compared with the case where a lens-barrel is attached to a light source support means after fixing a collimator lens to a lens-barrel with adhesives, there are few assembly mark and an attachment activity is also easy mark. In addition, since adhesives are not needed, there is also no possibility of causing troubles, such as contraction of adhesives and a focus gap by swelling.

[0011]

[Example] The example of this invention is explained based on a drawing.

[0012] Drawing 1 is light equipment E1 by the 1st example. It is what is shown. This The base material 1 which is the light source support means of the laser diode which is the light source which is not illustrated, The lens holder 11 which is the guidance means of the L type which are this base material 1 and one, It consists of a collimator lens 2 energized by the elastic member 3 which is the energization means by which the bis-stop was carried out to this at L type contact side 11a of a lens holder 11. Said laser diode It is supported so that the optical axis of the laser beam which is illumination light generated from now on may become parallel to L type contact side 11a of a lens holder 11, and it unites with the base material 1 by approaches, such as press fit.

[0013] Two of three parts which estranged the collimator lens 2 to the hoop direction are contacted by L type contact side 11a of a lens holder 11, and an elastic member 3 is pressed by the one remaining parts. Thus, it is held so that the optical axis of a collimator lens 2 may become parallel at L type contact side 11a of a lens holder 11. Light equipment E1 When attaching a collimator lens 2, if the elastic force was resisted, where an elastic member 3 is raised first, L type contact side 11a of a lens holder 11 is contacted in a collimator lens 2, and, subsequently to the configuration of a basis, an elastic member 3 is returned. Focus doubling of a collimator lens 2 is in the condition which had eliminated the elastic member 3 using the well-known tool with the condition of having energized the collimator lens 2 to L type contact side 11a of a lens holder 11, by the elastic member 3, and is performed by moving a collimator lens 2 along with L type contact side 11a.

[0014] In addition, instead of setting whole one side of a lens holder 11 to L type contact side 11a, as shown in drawing 2 , V groove 21a extended in accordance with the optical axis of a laser diode at the pars basilaris ossis occipitalis of a lens holder 21 may be prepared, and you may constitute so that two parts of a collimator lens 2 may be contacted by the inside.

[0015] Since it is what attaches a collimator lens to the lens holder which are a laser diode and one directly according to this example Compared with the case where the lens-barrel holding a collimator lens is attached to the base material of a laser diode, assembly mark are reduced sharply. In addition, since a collimator lens is only energized to a lens holder by the elastic member, without using adhesives, there is also no possibility of focus doubling being performed after assembly termination of light equipment at any time, and also generating a focus gap with the swelling of adhesives or contraction.

Consequently, light equipment cheap and highly efficient moreover is realizable.

[0016] Drawing 3 is light equipment E2 by the 2nd example. It is the shown perspective view and drawing 4 shows the cross section. Light equipment E2 It has the collimator lens 5 inserted in the base material 4 which is the light source support means of laser diode 4a which is the light source, this and the lens holder 41 which is the cylinder member prepared in one, and the lens holder 41, and a collimator lens 5 is energized by the elastic member 6 which is the small energization means pressed fit in hole 41a formed in the lens holder 41 at inside 41b of a lens holder 41. Since it serves as the protection-from-light member for a lens holder 41 to prevent emission of the laser beam generated from laser diode 4a according to this example, the optical property of light equipment improves. Other points are the same as the 1st example.

[0017] Drawing 5 is light equipment E3 by the 3rd example. The decomposition perspective view and drawing 6 which are shown are the elevation. Light equipment E3 It has the collimator lens 8 by which fitting is carried out into the base material 7 which is the light source support means of the laser diode which is the light source which is not illustrated, this and the lens holder 71 which is the semicircle cylinder part material prepared in one, and a lens holder 71, and a collimator lens 8 is energized by the elastic member 9 which is the approximately cylindrical energization means which engages with the external surface of a lens holder 71, and covers the side-face opening 71a at inside 71b of a lens holder 71. That is, it expands because slit 9a of the approximately cylindrical elastic member 9 engages with a lens holder 71, and by this, hollow 9b is formed in the center section of the elastic member 9, and this hollow 9b engages with a collimator lens 8, and energizes this to inside 71b of a lens holder 71. Also in this example, it has a function like the 2nd example as a protection-from-light member from which a lens holder 71 and an elastic member 9 protect emission of the laser beam of said laser diode. Other points are the same as the 1st example.

[0018]

[Effect of the Invention] Since this invention is constituted as above-mentioned, effectiveness which is indicated below is done so.

[0019] Attachment of a collimator lens is easy, and since assembly mark do not need adhesives for few tops, either, the light equipment which a possibility of producing the trouble by this does not have, either is realizable. If such light equipment is used, high-performance-izing and low-pricing of an optical disk unit etc. can be promoted greatly.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the perspective view showing the 1st example.

[Drawing 2] It is the perspective view showing the example of a complete-change form of the 1st example.

[Drawing 3] It is the perspective view showing the 2nd example.

[Drawing 4] It is the sectional view showing the cross section of the 2nd example.

[Drawing 5] It is the decomposition perspective view showing the 3rd example.

[Drawing 6] It is the elevation showing the 3rd example.

[Drawing 7] It is an explanatory view explaining an optical disk unit.

[Drawing 8] It is the sectional view showing conventional light equipment.

[Drawing 9] It is the sectional view showing only the collimator lens and lens-barrel of equipment of drawing 8.

[Description of Notations]

1, 4, 7 Base material

2, 5, 8 Collimator lens

3, 6, 9 Elastic member

4a Laser diode

11, 21, 41, 71 Lens holder

[Translation done.]